

ABSTRACT

Disclosed is a method for producing cardiomyocytes *in vivo* by administering to the heart of an individual a cardiomyocyte producing amount of mesenchymal stem cells. These cells can be administered as a liquid injectible or
5 as a preparation of cells in a matrix which is or becomes solid or semi-solid. The cells can be genetically modified to enhance myocardial differentiation and integration. Also disclosed is a method for replacing cells *ex vivo* in a heart valve for implantation.

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